

In the Claims

Please cancel claims 3-10, 16, 18, 20, 27-30, 32, 33, 36 and 37.

Please amend claims 1, 2, 11, 13, 14, 21, 23, 26, 31, 34 and 35 as follow:

1. (Currently Amended) An apparatus for warming-up a fuel cell, wherein a supply gas is supplied into the fuel cell and discharged as an exhaust gas after being utilized by the fuel cell, the apparatus comprising:

means for returning an exhaust gas, ~~wherein the means for returning an exhaust gas returns the exhaust gas to the supply gas depending upon the a~~ warming-up conditions of the fuel cell at the time when the supply gas is supplied into the fuel cell and at the time the fuel cell discharges the exhaust gas at a time of starting up the fuel cell, and when the temperature of the fuel cell is lower than a prescribed level.

2. (Currently Amended) The apparatus for warming-up a fuel cell as claimed in Claim 1, further comprising:

a controller for controlling said means for returning the exhaust gas ~~depending upon the temperature of the exhaust gas~~ when the temperature of the fuel gas is lower than a prescribed temperature.

3-10. (Canceled)

11. (Currently Amended) The apparatus for warming-up a fuel cell as claimed in Claim 1, wherein said supply gas is air which is supplied to an oxygen pole side of the fuel cell, and further comprising a ~~controlling~~ controller for controlling said means for returning the exhaust gas depending upon the amount of oxygen in the air supplied into the oxygen pole of the fuel cell.

12. (Previously Presented) The apparatus for warming-up a fuel cell as claimed in Claim 11, wherein the means for returning the exhaust gas decreases the amount of exhaust gas to be returned when the amount of oxygen is decreased due to the power generation of the fuel cell.

13. (Currently Amended) An apparatus for warming-up a fuel cell which supplies a supply gas into the fuel cell and which discharges the supply gas as an exhaust gas after being utilized in fuel cell, said apparatus comprising:

a compressor for compressing the exhaust gas to generate heat by adiabatic compression and supplying the exhaust gas to the supply gas,

wherein the supply gas is heated by the exhaust gas, the heated supply gas is supplied into the fuel cell to warm the fuel cell, and ~~the~~ all of the exhaust gas discharged from the fuel cell is returned to the compressor to form a circulation cycle during a warming-up period at a time of starting up the fuel cell and when the temperature of the fuel cell is lower than a prescribed level.

14. (Currently Amended) The apparatus for warming-up a fuel cell as claimed in Claim 13, wherein said circulation cycle includes a heat exchanger ~~disposed between the supply gas and the exhaust gas heated by the compressor, and the supply gas heated by the heat exchanger is supplied to the fuel cell~~ which conducts heat-exchange between supply gas drawn by the compressor in a negative pressure and the exhausted gas adiabatically heated by said compressor.

15. (Previously Presented) The apparatus for warming-up a fuel cell as claimed in Claim 13, further comprising a controller for determining whether or not the warming-up of the fuel cell has been completed, wherein the power generation of said fuel cell is started after the warming-up is determined to be completed.

16. (Canceled)

17. (Previously Presented) The apparatus for warming-up a fuel cell as claimed in Claim 15, wherein the controller determines completion of the warming-up based on the temperature of the exhaust gas discharged from the fuel cell.

18. (Canceled)

19. (Original) The apparatus for warming-up a fuel cell as claimed in Claim 13, wherein said supply gas is air which is supplied to an oxygen pole side of the fuel cell, when the amount of oxygen in said circulation cycle is decreased due to the power generation of the fuel cell, the fresh air is taken to replenish oxygen.

20. (Canceled)

21. (Currently Amended) The apparatus of claim 1, further comprising a heat exchanger ~~for transferring heat from the exhaust gas to the supply gas, wherein the heat exchanger is disposed between said means for returning an exhaust gas and a discharge port of the fuel cell~~ which conducts heat-exchange between supply gas and the exhausted gas.

22. (Previously Presented) The apparatus of claim 1, further comprising a humidifier for humidifying the supply gas.

23. (Currently Amended) An apparatus for warming-up a fuel cell at a time of starting up the fuel cell, wherein a supply gas is supplied into the fuel cell and discharged as an exhaust gas after being utilized by the fuel cell, the apparatus comprising:

means for returning an exhaust gas, ~~wherein the means for returning an exhaust gas returns the exhaust gas to the supply gas when the~~ a temperature of the fuel cell is below a predetermined level.

24. (Previously Presented) The apparatus of claim 23, wherein the means for returning an exhaust gas stops returning the exhaust gas to the supply gas when the temperature exceeds the predetermined level.

25. (Previously Presented) The apparatus of claim 23, wherein the means for returning an exhaust gas returns all of the exhaust gas to the supply gas when the temperature of the fuel cell is below a predetermined level.

26. (Currently Amended) An apparatus for warming-up a fuel cell at the time of starting a fuel cell and when the temperature of the fuel cell is lower than a predetermined temperature, wherein a supply gas is supplied into the fuel cell and discharged as exhaust gas after being utilized by the fuel cell, the apparatus comprising:

means for returning an exhaust gas, wherein the means for returning an exhaust gas returns the exhaust gas to the supply gas depending upon the conditions of the supply gas when the supply gas is supplied into the fuel cell and the conditions of the exhaust gas after the fuel cell discharges the exhaust gas.

27-30. (Canceled)

31. (Currently Amended) ~~The~~ A method ~~of claim 30~~ for warming-up a fuel cell,
~~further~~ comprising the step of:
supplying a supply gas to a cathode of a fuel cell, wherein the fuel cell reacts the
supply gas to produce an exhaust gas;
measuring the temperature of the exhaust gas;
returning the exhaust gas to the supply gas when the temperature of the exhaust gas is
lower than a predetermined level;
measuring the temperature of the supply gas when the temperature of the exhaust gas
is lower than a predetermined level; and
~~decreasing an opening in a pressure control valve to increase~~ increasing the
temperature of the exhaust gas if the temperature of supply gas is less than a predetermined
level.

32-33. (Canceled)

34. (Currently Amended) ~~The~~ A method ~~of claim 33~~ for warming-up a fuel cell,
~~further~~ comprising the step of:
supplying a supply gas to a cathode of a fuel cell, wherein the fuel cell reacts the
supply gas to produce an exhaust gas;
compressing the exhaust gas to increase the temperature of the exhaust gas,
measuring the temperature of the compressed exhaust gas,
returning the exhaust gas to the supply gas when the temperature of the exhaust gas is
lower than a predetermined level; and
~~increasing an opening in a pressure control valve if the temperature of the compressed~~
exhaust gas exceeds a predetermined level.

35. (Currently Amended) The method of claim ~~33~~ 34, further comprising the step
of:
generating an alarm if compressed exhaust gas continues to exceed predetermined
level after a predetermined time period.

36-37. (Canceled)

Please add claims 38-43 as follow:

38. (New) An apparatus for warming-up a fuel cell, wherein a supply gas is supplied into the fuel cell and discharged as an exhaust gas after being utilized by the fuel cell, the apparatus comprising:

means for measuring the temperature of the exhaust gas;

means for returning an exhaust gas, wherein the means for returning an exhaust gas returns an the exhaust gas to the supply gas when the temperature of the exhaust gas detected by said means for measuring the temperature of the exhaust gas is lower than a predetermined level;

means for measuring the temperature of the supply gas when the temperature of the exhaust gas is lower than a predetermined level; and

a pressure control valve which controls the pressure of the exhaust gas to thereby control the temperature of the exhaust gas, wherein an opening in said pressure control valve is decreased to increase the temperature of the exhaust gas.

39. (New) An apparatus for warming-up a fuel cell, wherein a supply gas is supplied into the fuel cell and discharged as an exhaust gas after being utilized by the fuel cell, the apparatus comprising:

means for measuring the temperature of the exhaust gas;

a compressor, which discharges the exhaust gas from the fuel cell and which returns the exhaust gas to the supply gas, wherein said compressor returns the exhaust gas to the supply gas when the temperature of the exhaust gas detected by said means for measuring the temperature of the exhaust gas is lower than a predetermined level, and wherein said compressor compresses the exhaust gas to increase the temperature of the exhaust gas;

means for measuring the temperature of the compressed exhaust gas; and

a pressure control valve which controls the pressure of the exhaust gas having being compressed by the compressor, wherein an opening in said pressure control valve is increased if the temperature of the compressed exhaust gas exceeds predetermined level.

40. (New) An apparatus for warming-up a fuel cell which supplies a supply gas into the fuel cell by a negative pressure suction by a compressor provided on a downstream of the fuel cell, and which discharges the supply gas in an exhaust gas after being utilized in the fuel cell, as an exhaust gas, having being compressed by said compressor, comprising

means for returning an exhaust gas, which has been heated by adiabatic compression through said compressor, wherein said means for returning an exhaust gas returns the exhaust gas at the time of starting up the fuel cell and also the temperature of the fuel cell is lower than a predetermined level.

41. (New) The apparatus as claimed in Claim 40, further comprising a heat exchanger which conducts exchange between supply gas drawn by the compressor in a negative pressure and the exhausted gas adiabatically heated by said compressor.

42. (New) The apparatus as claimed in Claim 41, further comprising a valve, which enhance the temperature of the exhaust gas when it is actuated towards the closing direction, provided downstream of the heat exchanger, to enhance the temperature of the exhaust gas introduced into the heat exchanger.

43. (New) The apparatus as claimed in Claim 40, wherein the means for returning an exhaust gas returns all of the exhaust gas to the supply gas when the temperature of the fuel cell is below a predetermined level.